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[This Drawing is a reproduction of the Original on a reduced scale.]

Br.

Fig. 1.

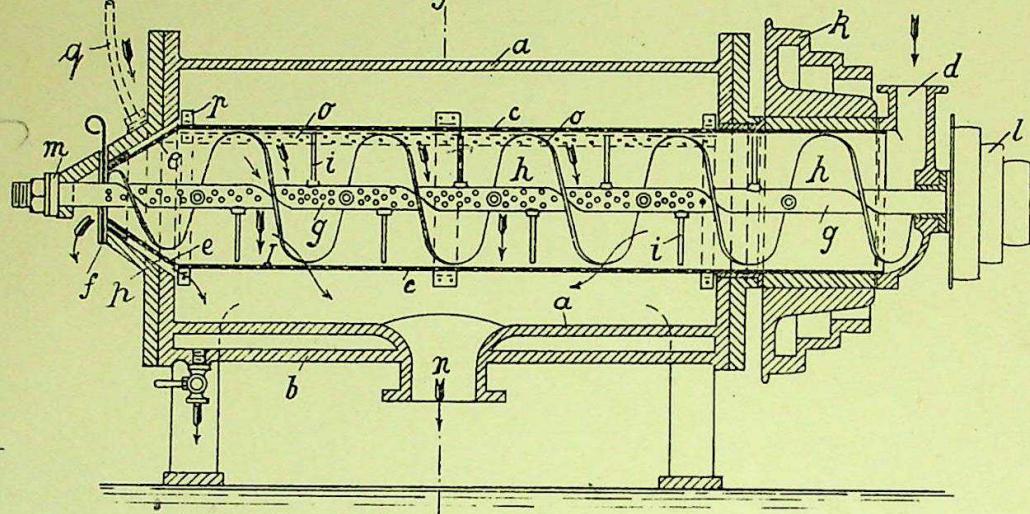


Fig. 2.

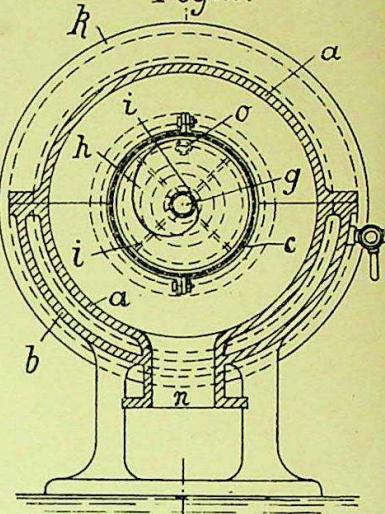
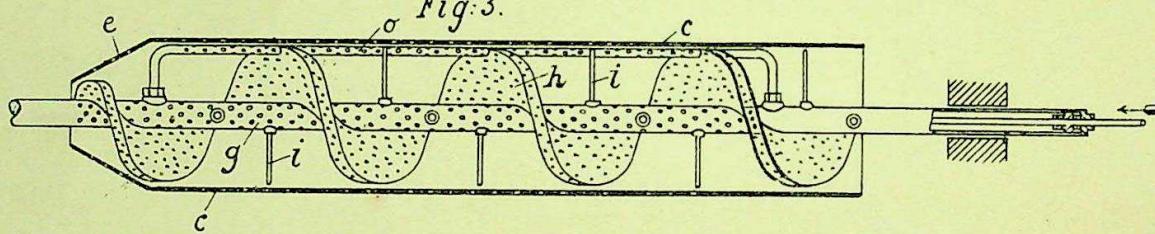


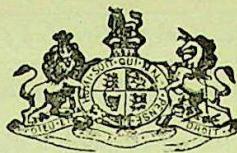
Fig. 3.



426/29

5/ Mashing process
51. 1896
SSOS. Ac

N° 14,482



A.D. 1895

RECORDED

Date of Application, 30th July, 1895

Complete Specification Left, 28th May, 1896—Accepted, 4th July, 1896

PROVISIONAL SPECIFICATION

Method and Apparatus for Treating Mash in Brewing for Obtaining the Wort therefrom.

I, VALENTIN LAPP, of Leipzig-Lindenau, Germany, do hereby declare the nature of this invention to be as follows:—

It has not been possible hitherto in brewing processes to obtain the wort produced by the malting process of good quality and clear from the spent grain in a short time, because the spent grain has always been introduced into the filters together with the malt.

According to my present invention the above defect is obviated by effecting the separation of the spent grain from the wort before filtering the latter, and I effect these separate operations in such manner as to produce the wort continuously.

The essential feature of the invention consists in separating the wort from the grain in a sifting apparatus without in the first instance using washing water.

The grain remaining in the sifting apparatus is then led continuously over the sieve surface and is at the same time subject to the action of water jets, whereby it is continuously washed out with fresh water while the wort also flows continuously from the same. By this means the result is obtained that the practical yield of wort is nearly equal to the quantity that should be obtained according to theory.

The apparatus which I employ for carrying out this method of operating is constructed as follows.

A cylindrical casing, divided longitudinally into two halves secured together by flanges, has at the lower half a heating device, such as a steam or hot water jacket. Within the casing is a rotating perforated cylinder, also preferably divided longitudinally into two halves to facilitate cleansing, into which the mash, after completion of the mashing process, is introduced through a pipe at one end. The other end of the cylinder is formed conical and is provided with a slide; through it the perfectly washed spent grain is forced out.

Centrally within the perforated cylinder is a hollow axis, having perforations on the part extending from the coned end of the cylinder to about two thirds of the length thereof, so that the spent grain is subject to the action of water jets at 60° C. issuing through the perforations of the axis from a point at about one third the distance from the inlet end of the cylinder, to the outlet end. The perforated axis has fixed to it helical blades and radially arranged blades or bars so that on the rotation of the axis the screw blades convey the grain from the inlet to the outlet end while the radial blades or bars stir it up as it travels along.

The rotation of the perforated cylinder and of the perforated axis and its blades and stirrers is effected preferably by two sets of stepped pulleys for enabling them to be rotated in contrary directions at varying speeds. The perforated axis is closed at its one end by a screwed cap, on the removal of which the interior can be cleansed.

The mash coming from the mash tun being introduced into the inlet end of the perforated cylinder, the wort escapes through the perforations thereof into the

[Price 8d.]

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surrounding casing while the mash travels along the first part of the cylinder where the axis is not perforated.

From the casing the wort is led off through a discharge pipe.

The spent grain remaining in the cylinder, in being conveyed along by the screw blades and stirred up by the stirrers, is subject to the action of comparatively 5 small quantities of washing water issuing from the perforated axis so as to be gradually more and more washed out thereby, as the water acts progressively on grain which becomes gradually poorer in wort. The water containing the remainder of the wort flows off through the same discharge pipe that leads off the wort.

On the grain passing into the coned end of the cylinder, the remaining water is pressed out of it and drains back into the other part of the cylinder, the discharge of the grain being regulated by the slide valve so as to obtain any desired degree of compression of the grain by the action of the screw blades.

During the above operation the casing is heated so as to prevent the cooling of 15 the wort.

One or more perforated tubes may be inserted into the perforated cylinder near the inner surface thereof, for sprinkling water over the cylinder so as to wash down the grain carried up, and to keep the perforations clear, the tube or tubes being fixed to the perforated cylinder and communicating at the one end with an annular 20 channel in the casing which is supplied with water.

These perforated tubes may be connected to the hollow axis and supplied therefrom with water for sprinkling. Also the blades, mounted upon the axis, may be hollow and perforated and also supplied with water for sprinkling from the hollow axis, so that a larger quantity of water can be sprinkled on 25 the grain.

Dated this 30th day of July 1895.

ABEL & IMRAY,
Agents for the Applicant.

COMPLETE SPECIFICATION.

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Method and Apparatus for Treating Mash in Brewing for Obtaining
the Wort therefrom.

I, VALENTIN LAPP, of Leipzig-Lindenau, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

It has not been possible hitherto in brewing to separate the beer worts, produced by the mashing process, completely and rapidly from the grains and to obtain a pure and clear wort, because the grains were always brought together with the worts into the filter presses where the worts were expressed.

Now according to the present invention the worts are obtained in a perfect 40 manner by first completely separating the grains from the worts and then filtering the latter by themselves.

This mode of obtaining the worts is effected in a continuous operation.

The process is carried out in the following manner:—

First the worts, without any addition of water, are separated from the grains in 45 a straining apparatus. The grains left behind in the straining apparatus are then moved along the straining surface and are at the same time subjected to the action of jets of water. This water is supplied in such a manner that the grains which are being moved slowly along the straining surface are being continually sprayed over again and washed by fresh water the water then flowing off with the 50 levigated worts.

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In this manner there is obtained a result which yields the utmost maximum that is practically possible.

The apparatus employed in this process is shewn on the accompanying drawing in which Fig. 1 shews a longitudinal section and Fig. 2 a cross section. The apparatus 5 is usually arranged between the mash tun and the filtering apparatus.

The apparatus comprises a fixed casing *a* composed of two parts bolted together, and the lower half of which is provided with a heating device, for example with a steam jacket *b* which encloses about half of the casing and is adapted to be heated by steam or hot water.

10 Arranged in the casing *a* and so as to be capable of rotating therewith is a perforated cylinder *c* which is also made in two parts for facilitating the cleaning thereof, and into one end of which the mash is supplied by a pipe *d* after the mashing process is completed. The other end *e* of the perforated cylinder is made of conical shape and is provided with a sluice or sliding valve *f*. At this end 15 the grains are ejected when completely washed or lixiviated.

Inside the perforated cylinder *c* there is arranged a rotary shaft *g* which is perforated from a point at about one-third of its length from the inlet side of the mash, up to the conical end *e*, for the purpose of supplying water of about 20 60° Celsius in the direction of the arrow I for about two-thirds of the length of the perforated cylinder for washing the grains.

The shaft is fitted with a helical conveyor or worm consisting of helical blades *h* for conveying the grains in the longitudinal direction of the perforated cylinder, and with radially arranged knives or bars *i* for continually loosening the grains. The perforated cylinder *c* and the hollow shaft *g* are driven preferably by means of 25 stepped belt pulleys *k* and *l*, so that these two parts may be caused to revolve at various speeds according to requirement.

The cylinder and the shaft are caused to revolve in opposite directions.

The perforated shaft is provided at its end with a readily removable screw 30 cap on the removal of which the hollow shaft may be readily cleaned from the inside.

This separating apparatus operates as follows:—As the mash, being conveyed to the apparatus after the completion of the mashing process, travels along the non-perforated portion of the hollow shaft, the worts are separated from the grains by simply draining off, the worts flowing away through the strainer holes of the 35 cylinder *c* into the lower space of the casing *a*, whence the worts are discharged through the pipe *n*.

The grains that are being propelled along by the blades *h* and are during this time being loosened by the knives *i*, are now washed more and more in comparatively small quantities by the water which is supplied by means of the hollow 40 shaft. In this operation the water always meets grains that have a decreasing quantity of worts and thus frees the grains completely from the worts. The water which in this manner carries away all the worts with it, flows also through the strainer holes of the cylinder and away through the discharge union *n*.

On the entrance of the grains in the conical portion *e* of the perforated cylinder, 45 the water that is still adhering to the grains, is caused by the conical shape of the part *e* to flow back into the cylinder, or through the strainer holes of this part, and into the casing *a*. The exit of the grains may be controlled by adjusting the sliding valve *f* that is to say, it may be more or less diminished or retarded, in such a manner that on being pressed out by the pressure of the worm conveyor *h*, 50 the very last remnants of wort-containing water are obtained and led back into the casing *a*.

During the whole of this process the casing is heated in order to obviate cooling of the worts.

Inside the perforated cylinder *c* a second perforated pipe *o* may be provided near 55 the jacket, for the purpose of spraying water upon the outwardly propelled grains and of keeping the strainer holes of the cylinder *c* clean.

This pipe may be fixed to the cylinder shell, and receive its spraying water in all

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positions from a circular channel *p* in the conical portion of the casing *a* to which the water is supplied by means of a pipe *q*.

The perforated pipe *o* may also be fixed to the shaft *g* as indicated in Fig. 3, and it may receive its spraying water from the interior of the hollow shaft *g*.

Also the blades *h* (as indicated in Fig. 3) may be made hollow and be perforated, 5 and receive spraying water from the interior of the hollow shaft, in order to enable as large a quantity as possible of water to be sprayed in all parts of the apparatus for the purpose of washing the grains.

This process has also the advantage of enabling the malt to be mashed in a very minute state of subdivision, which subdivision may be effected if desired also in a 10 wet state.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is :—

1. Process for the production of beer worts in continuous operation, wherein the 15 worts are first strained off from the grains in a straining apparatus, after which the residual grains are continuously moved along over strainer surfaces and are continually being stirred or loosened, and are at the same time washed by jets of water, the water together with the levigated worts flowing off through the strainer holes, so that the washing process is continually being repeated, until finally the 20 completely washed grains are pressed out of the straining apparatus, substantially as described.

2. An apparatus for carrying out the process set forth in the first claim consisting of a rotary perforated cylinder *c* in combination with a worm conveyor *h* arranged in the said cylinder but capable of independent rotation and a hollow shaft *g* extending along the cylinder *c* and provided with spraying holes for the 25 purpose of supplying water, which holes commence only at that part of the apparatus where the worts have already been mainly drained off from the charge of mash through the strainer cylinder *c* substantially as described.

3. In combination with the worts separating apparatus set forth in the second 30 claim, a perforated spraying pipe *o* arranged at the periphery of the perforated cylinder *c* and hollow perforated blades *h* for the purpose of spraying water upon the outwardly propelled grains and into the centre of the cylinder *c* substantially as described.

Dated this 28th day of May 1896.

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ABEL & IMRAY,
Agents for the Applicant.